

# Future Aviation Safety Concerns



Christopher A. Hart  
Chairman, NTSB

# Outline

- NTSB Basics
- Some Future Airline Safety Concerns



# NTSB 101

- Independent federal agency, investigate transportation mishaps, all modes
- Determine probable cause(s) and make recommendations to prevent recurrences
- Primary product: Safety recommendations
  - Favorable response > 80%
- *SINGLE FOCUS IS SAFETY*
- Independence
  - Political: Findings and recommendations based upon evidence rather than politics
  - Functional: No “dog in the fight”



# Three Future Safety Concerns

- Quantity and quality of pilots
- Overzealous criminalization of accidents
- Increasing automation



# Pilots: Quantity

## *Problem*

- Colgan accident in Buffalo (2009) generated 1500-hour requirement
- But both pilots in Colgan >1500 hours
- New requirement improving safety?

## *Solution*

- Metric should be based upon quality, not quantity



# Pilots: Quality

## *Problem*

- Loss of military pilot pipeline
- Military: “Right Stuff” or out

## *Current Civilian System*

- Written test: Knowledge
- Flying test: Skills and knowledge
- *Not tested: Judgment or professionalism*
- *No limit on how many times to take tests*



# Abundant Professionalism

- Hudson River landing (2009)
- Gliding to the Azores (2001)
- Sioux City (1989)
- Gimli Glider (1983)



# Lack of Professionalism

- Let's try FL 410 (2004)
- Takeoff without runway lights (2006)
- Minneapolis over-flight (2009)
- Stick shaker: PULL! (2009)



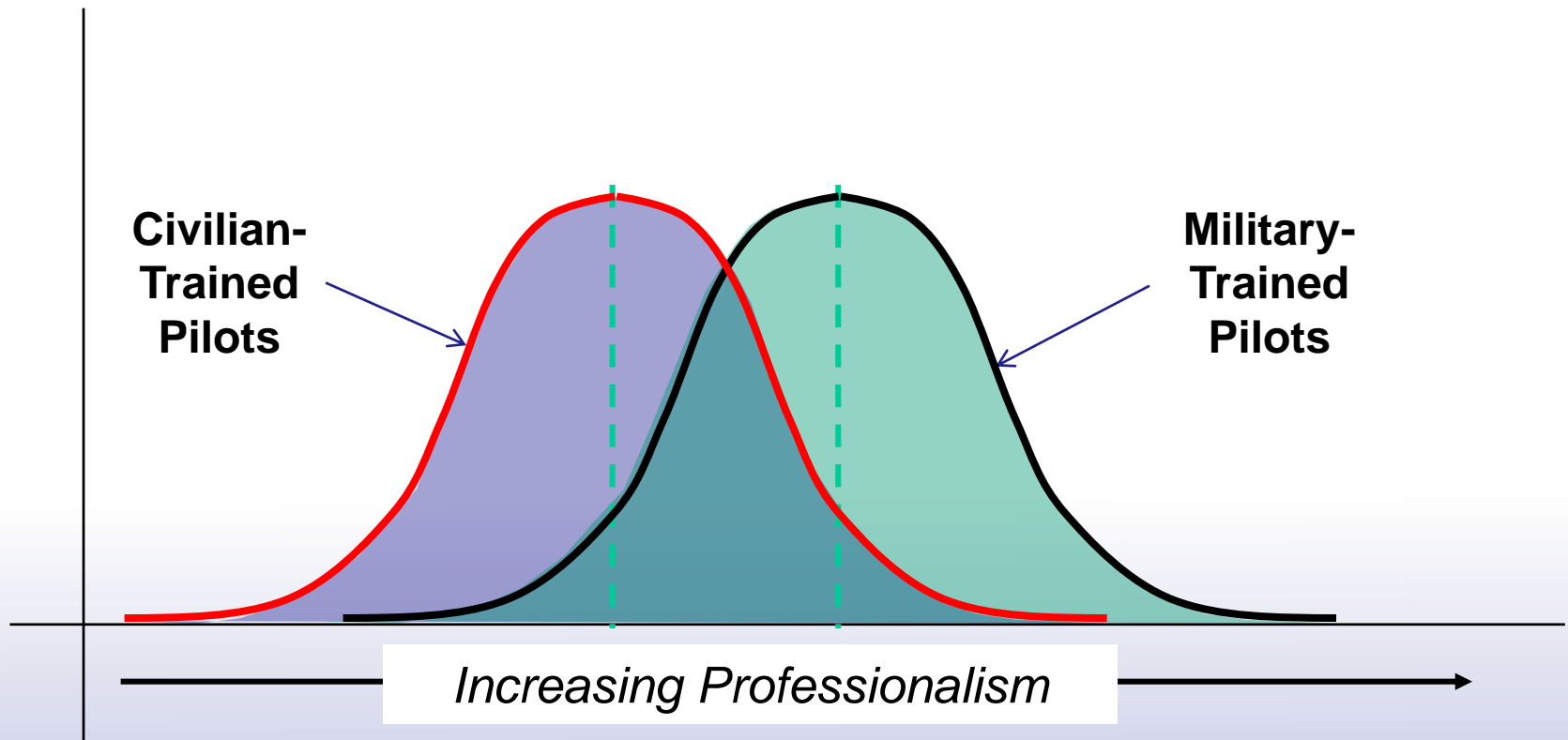


# The Training Challenge

- Initial training must:
  - Develop knowledge and skills
  - Be evaluated by more than just (eventually) passing knowledge and skill tests
  - Also develop and instill good judgment and professionalism
- Recurrent training must:
  - Continue to develop and strengthen all of the above



# Need to Shift the Bell Curve



# Overzealous Criminalization

- Systems are getting more complex
- Most accidents involve good people trying to do the right thing under sometimes difficult circumstances
- Human error: Immediate response is to *PUNISH!*
- Issue: Best way to stop error that is *inadvertent?*



# Undesirable Results

*Possibility* of criminalization:

- Chills willingness of front-line employees to participate in proactive information programs
- Hinders mishap investigations
- Reduces likelihood of investigating or addressing system issues



# Recent Examples

- Concorde, Paris, France (2000)
- GOL 1907, Brazil (2006)



# Concorde

## – Chain of Events

- Takeoff
- Piece of metal on runway from previous airplane
- Main gear tire shredded after hitting piece of metal
- Fragments from tire hit wing, punctured fuel tank
- Leaking fuel caught fire



# GOL 1907

## – Chain of Events

- Aircraft eastbound, FL 370, per international convention
- Assigned route turned westbound at navigation waypoint
- Go to even thousand (FL 380 or 360)?
- Pilots tried unsuccessfully to contact controllers, so remained at FL 370
- Transponder on “Standby” (for long time), hence
  - Airplane invisible to ATC
  - Airplane also invisible to TCAS in other airplanes
- Both airplanes navigating with GPS



## – Theory

- Pilot's foot on footrest hit transponder “Standby” button



# Increasing Automation

- When it *malfunctions*:
  - Increasing complexity increases likelihood that operators will not completely understand the system
  - Increasing reliability increases likelihood that operators have never seen a given malfunction before, even in training
- When it's working *properly*:
  - Complacency, degradation of skills
  - Adverse impact on professionalism?





# Examples

- Amsterdam, Holland (2009)
  - Rio to Paris (2009)
- San Francisco (2013)



# Amsterdam, Holland

## – The Conditions

- Malfunctioning left radar altimeter
- Pilots selected right side autopilot
- Aircraft vectored above glideslope
- Autothrust commanded throttles to idle
- Unknown to pilots, right autopilot using left radar altimeter
- Pilot unsuccessfully attempted go-around



## – Queries:

- Should autopilot default to same side altimeter?
- More clarity re source of information? Ability to select?



# Rio to Paris

## – The Conditions

- Cruise, autopilot engaged
- Night, in clouds, turbulence, coffin corner
- Ice blocked pitot tubes
- Autopilot and autothrust inoperative without airspeed
- Alpha protections also inoperative
- Pilots' responses inappropriate



## – Queries:

- Pilot training re loss of airspeed information in cruise?
- Importance of CRM – pilot knowing other pilot's actions?
- Pilot training re manual flight at cruise altitude?



# San Francisco

- Clear day, negligible wind, runway > 11,000'
- Electronic glideslope inoperative, but visual glideslope available
- Pilot rarely did manual approach
- Pilot unaware that autothrottle on standby, not controlling selected speed
- Poor control of speed (34 knots under Vref) and altitude
- Crashed into seawall



# Undercutting Professionalism?

- Many U.S. subway systems: Automation
  - Starts the train out of the station
  - Observes speed limits, avoids collisions
  - Stops the train in the next station
  - Opens the doors
- Operator
  - Closes the doors
- Issues
  - Work for pay, rather than for job well done?
  - Job satisfaction/professionalism?



# Conclusion

*In order to continue improving safety, the industry must address issues of professionalism, overzealous criminalization, and increasing automation*



Thank You

***Questions?***



National Transportation Safety Board